WE CLAIM:

1. A system for managing a network comprising:

a first network element;

a second network element connected to said first network element;

a network management system connected to said first and second network elements; and

wherein said first and second network elements each include means for encoding a unique identifier associated with each of said network elements, a processor coupled to said encoding means, and means for physical layer auto-discovery.

2. The system in accordance with claim 1 wherein said means for physical layer auto-discovery comprises:

a program storage device readable by a processor and tangibly embodying a program of instructions executable by the processor to perform a method of communicating connectivity information between said first and second network elements, the method comprising the steps:

sending a request packet at the physical layer from the first network element to the second network element; and

receiving a respond packet at the physical layer in response to said sent request packet.

3. The system in accordance with claim 2 wherein said request packet comprises a first packet protocol identifier, a sequence number, and a padding.

4. The system in accordance with claim 2 wherein said response packet comprises a second packet protocol identifier, said sequence number, a far end electronic serial number, a far end port identifier, and a padding.

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1   5. The system of claim 1 wherein said first network element is connected to

2   said second network element by an optical fiber link.

1   6. A method for automatically discovering a network topology comprising the

2   steps of:

3   assigning an electronic serial number and unique port identifier to a network

4   element;

5   representing the network element in a network management system based on

6   said assigned electronic number;

7   communicating connectivity information between the network element and a

8   neighboring network element based on said assigned electronic serial number and

9   unique port identifier; and

10   communicating said connectivity information to the network management

11   system so that the connectivity information is associated with said representation of

12   the network element.

1   7. The method in accordance with claim 6 wherein said step of assigning an

2   electronic serial number comprises the steps of assigning a network element model

3   number and a network element serial number.

1   8. The method in accordance with claim 6 wherein said step of representing

2   the network element in a network management system comprises the step of

3   assigning a CORBA object to the network element and associating the CORBA

4   object with said assigned electronic serial number.

1   9. A network element comprising means for encoding an electronic serial

2   number associated with each the network element, a processor coupled to said

3   encoding means, and means for physical layer auto-discovery coupled to said

4   processor and wherein said processor uses the encoded electronic serial number

5   and the autodiscovery means to discover all other network elements linked to the

6   network element.

1   10.A request packet for use in a physical layer auto-discovery protocol

2   comprising a packet protocol identifier, a sequence number, and padding.

1   11.A response packet for use in a physical layer auto-discovery protocol

2   comprising a packet protocol identifier, a sequence number, a far end electronic

3   serial number, a far end port identifier, and padding.